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An Account of the Tornado Which Visited Saint Cloud, Minnesota, April 14, 1886

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current from Wright county east, northeast to the edge of Wisconsin, proved by the presence of the gray or blue till with limestone bowlders overlying the red till; the driftless area, extending into the southeast part of the state to include Houston and Winona counties and the eastern portions of Fillmore, Olmsted, Wabasha and Goodhue counties; the surface of this area being residual clay from eroded strata, partially modified by the water of a lake confined there by the ice-sheet confluent farther south; the beaches of the glacial lake Agassiz, held by the retreating ice-sheet in the basin of the Red and Rainy rivers, the outlines of a similar glacial lake which existed earlier in the basin of the Blue Earth and Minnesota rivers, and the former shore of lake Superior, which in like manner was held 500 feet higher than now, having its outlet southwestward to the St. Croix and Mississippi rivers; and the thickness of the drift as shown by deep wells, being found to average 100 to 200 feet upon the western two-thirds of the state, where it conceals the older rocks over large districts, including all of the basin of the Red River of the North in Minnesota.

20. The subsoils: clay and loam in the Red river valley, in the southwest corner of the state, and on the driftless area; sand and gravel covering considerable tracts from Dakota county, Saint Paul and Minneapolis northwestward to the Crow Wing river and the sources of the Mississippi; gray or blue till, occupying the greater part of the state; red till, reaching from lake Superior southwest to Brainerd and south to Saint Paul; and a track bordering the international boundary eastward from Rainy and Vermilion lakes, where only scanty patches of soil are found, the surface being mostly bare rock with many little lakes.

May 4, 1886.

[*Paper W.*]

AN ACCOUNT OF THE TORNADO WHICH VISITED SAINT CLOUD, MINNESOTA, APRIL 14, 1886.—*C. W. Hall.*

At seven o'clock on the morning of April 11th, last, an area of low barometric pressure was detected by the U. S. Signal officers centering a few miles north of San Francisco, Cal. This

area moved steadily eastward. At three o'clock, the same day, it had reached the center of Nevada; at 11 o'clock that evening, (75th meridan time,) it had reached the Great Salt Lake valley. It continued to move eastward until three o'clock p. m. of the 12th, when it turned towards the north, and moved forward at a much slower rate. Its rate was so slow that 48 hours later, or at three o'clock of the 14th, by turning northeasterly in its course, it had only reached the Missouri valley a few miles from Bismarck. Continuing onwards northerly, swinging even a little towards the west, and then northeasterly, this low pressure center was last seen by the Canadian observers at lake Winnipegosis, on its northeasterly course to Hudson bay.

The progress of this area of low pressure was a remarkable one. Its course was characterized by great weather disturbances, and even some severe storms, until the culmination of disasters in the tornado, which swept over Saint Cloud, Sauk Rapids and Rice's Station a little after 4 o'clock on the afternoon of the 14th. The records of the U. S. Signal service recount them. From that hour on until the final disappearance of the cyclone, the winds and the storms kept almost perfect peace.

It appears that the towns named were upon the southeastern quarter of the great cyclonic rim, whose center on the afternoon of the 14th was west and northwest of Bismarck, Dakota. The tornado which proved so destructive moved from the southwest towards the northeast. Its effects could be seen and studied long after the storm had passed; what it was and how it looked, as a tornado, can only be known on the authority of eye witnesses. One of them says;*

"The tornado must have formed rapidly, and just about over the lake, as it was there when first noticed. It was very black and seemed constantly in motion. It was moving rapidly across the lake when first seen, was flat and oval in shape, with a sort of spiral at each of the extremities, one extending upward and the other downward. It was peculiar in appearance and I watched it closely. After having passed across the lake it seemed to stop. The movement resembled that of a fan opening and closing, and it remained stationary for some seconds. Almost instantly the form changed. Instead of lying flat it seemed to turn on end and the spirals that ran up from the other end formed a part of a big double spiral. It had a movement that was peculiar, as if there was a commotion within it. The course was rapid, and as soon as the big spiral was formed it began moving at a

*Monthly Weather Review, Washington, April 1886, p. 100.

terrific rate in a course that was somewhat zigzag. It dropped down to the ground, and I saw the entire work of ruin. The course of the tornado after crossing the river was rather sinuous, though hardly as much so as before. It swept across the country, and in five minutes from the time of reaching Sauk Rapids the work of destruction was done. There were two clouds at first that came together directly over the lake, and then turned on end and swept onward."

Other observers have told the story of this tornado. Their accounts, while differing slightly in one or two statements of fact touching the place of origin and the movements of the storm, all agree in describing this as one of the most destructive storms that has ever visited the northern states. One of the keenest of these observers was Rev. E. V. Campbell, of Saint Cloud: he, too, was one of the most assiduous in relieving the suffering caused and industrious in gathering the whole story of the storm. Chiefly from him in personal conversation, and in perusing the columns of the *Northwestern Presbyterian* of three days ago the writer has gathered the following data:

During nearly all of Wednesday the weather was chopped into little bits—rain, puffs of wind, sunshine and one brief hailstorm.* The atmosphere was peculiar; one tired easily; he was restless; the air was oppressive, almost muggy: storms threatened and would pass away, when the sun would shine out bright and beautiful. About three o'clock clouds again rose in the south and it seemed certain to rain. In half an hour the thought of a fire was suggested by a horrible, black object, a mile away to the west of the Campbell parsonage. It was not a fire; the object moved. Then was noticed the terrible grinding, crunching, low agonizing wail, once heard never to be forgotten. The writhing, whirling monster was steadily crossing the city. It had taken in its embrace a frightful, funnel-shaped, coal-smoke colored body from above, and on it moved. Its body seemed to carry hundreds of pieces of paper: now it is known that these were broken boards and timbers and shingles. Hundreds of feet up in air, how it tossed and toyed with these things as if they were only feathers, sometimes carrying them around in graceful curves, then, swift as lightning, shooting them sideways or downward out of sight.

*At Minneapolis between four and five o'clock in the afternoon, a terrific hailstorm took place, covering the ground with hailstones, some of them as large as small hens' eggs.

The tornado seems to have had its birth in the Masonic cemetery two miles south of Saint Cloud. East of this cemetery there is a depression with a considerable hill on the other three sides, making, at its foot, a basin. Here among the oak trees, the power of the tornado began to display itself. Trees as thick as a man's body were wrenched nearly square off 15 or 20 feet above the ground. Straight up the hill in a northwest direction the storm moved, leaving a clean track perhaps 100 feet wide. It swept along, tearing its way through timber and across fields, demolishing a Roman chapel and houses, and killing people on its way. As it entered the city it widened out to 600 feet, and changed its course to due north. More houses were destroyed, many of them utterly obliterated. The Saint Paul, Minneapolis and Manitoba railway freight depot was crushed like an eggshell. Loaded cars of immense weight and coupled together counted as nothing. 60 houses were destroyed in Saint Cloud and many people were killed, besides many more injured.

As the tornado crossed the Mississippi river to enter Sauk Rapids, it seemed to lift the water clear from the bottom, leaving the bed of the river bare. A portion of the bridge across the Mississippi at this point, standing in the course of the storm, was instantly removed, as was a large mill standing near. Court house, school house, stores, the hotel, and dwelling after dwelling all were swept away from the widening path of the tornado. Still going north, and when four miles east of Rice's Station and nine miles from Sauk Rapids, it struck a house where there had just been a marriage; the guests were kneeling at prayers. Without warning, nine, including the groom, the officiating clergyman and his wife were killed, and many more hurt, some of whom have since died.

Personal experience and incidents cannot here be mentioned; neither can particular instances of the destruction of property be enumerated. The total loss of life was over seventy, with many maimed who still survive. At least half a million dollars worth of property was destroyed, most of it belonging to private individuals, and those, too, who could ill afford to lose it. But public generosity has come promptly to their aid.

Many attendant phenomena could be mentioned, but only a few are selected. One iron safe was carried across the street without touching the ground, and landed on its top; another

weighing five tons was moved six feet and turned partly around. Some houses were turned on their foundations; others were neatly unroofed, and still others escaped with holes punched into them. A block of hardwood was found with a pine stick driven into it as an iron spike; a pine lath was found driven inches into the body of a tree. Chickens were literally stripped of their feathers, and barn doves were dashed to the ground, flattened as if a heavy stone had crushed them.

To many, and particularly to Mr. Campbell, this storm seemed evidently enough to be an *electric body*. It had not all the phenomena of a current, for it had distinct lateral limits. Outside its given track it left no traces save those made by flying timbers. Yet with the atmospheric conditions peculiar to a cyclonic area, the rush of the wind and the clearly defined limits of the spirally moving column, these same phenomena would be left.

When we have the details of the disaster, and look for its causes, we shall see as Professor Payne has pointed out,* that it was only the culmination of a series of causes extending over the preceding ten days. At this time, the winds which had been blowing since morning up the Mississippi valley, were warm and slight: at La Crosse, Saint Paul, Moorhead and Vincent, the temperature was 70 degrees Fahr. and above, really a summer's warmth; while at Duluth, and along the south shore of Lake Superior, the thermometer stood at 38 degrees Fahr., with the wind moving steadily towards the southwest. When this cold wind from the lake region had spread itself over a considerable area of the warm, stifling air of the Mississippi valley instead of becoming mixed with it, in the economy of nature a terrific movement must result. The relative positions of these two currents of air, the warm and the cold, were as unnatural as if a lake of oil were held down by an invisible film beneath an equal area of heavier water; when once this film should be punctured, the oil would seek its true place at the top of the water with irresistible energy.

The local conditions are never the same in any two tornadoes. These conditions,—the contour of the surface, the altitude of the contact zone of air, the direction of the winds, the humidity of the air,—all tend to modify to a marked degree the

*Monthly Weather Review, April 1886, p. 113.

force, and consequently the destructiveness of these storms. The latitude of Minnesota has saved our state from many of these visitors as Professor Payne has shown.*

NOTE.—In 1884, Sergeant John P. Finley, of the Signal Corps, U. S. Army, published a list of 600 tornadoes, which had been recorded in the United States, to the close of 1881. Twenty-two of that number occurred in Minnesota. For reference, a list of the Minnesota tornadoes is extracted from Sergeant Finley's table:

1875, August 25th; near Hutchinson. A very sultry day.

1876, May 20th; Fort Ripley.

1877, May 30th, afternoon; near Saint Paul. Storm went northeast.

1877, June 14th, afternoon; Langdon. Storm went northeast.

1877, June 29th; near Minneapolis. The day very sultry.

1877, July 1st; Waverly.

1877, July 7th, afternoon; Breckenridge. Time of passing, 3 minutes.

1875, July 3rd, evening; Goodhue county. Nine persons killed and thirty injured.

1880, June 5th; Lake Crystal.

1880, June 11th, afternoon; Mower county.

1881, June 12th, 4 p. m.; Blue Earth City. Storm went northeast.

1881, June 12th, 5 p. m.; Rice County. Storm went northeast.

1881, July 11th, 5 p. m.; Winona. Storm went northeast.

1881, July 15th, afternoon; West Newton. Five persons killed and twelve wounded; fifteen buildings demolished.

1881, July 15th, afternoon; Wellington. Many animals killed, some of which had pieces of timber driven through their bodies.

1881, July 15th, afternoon; Fairfield [Fairfax?]. Storm went southeast.

1881, July 15th, afternoon; Cairo.

1881, July 15th, 4:45 p. m.; New Ulm. Storm went southeast; forty-seven buildings demolished and two hundred partly wrecked; six persons killed and fifty-three wounded; loss estimated at $300,000 to $500,000.

1881, July 15th, 6 p. m.; Blue Earth county. Storm went east-southeast.

1881, July 16th, afternoon; Cottonwood county. Storm went northeast.

1881, July 16th, afternoon; Redwood county. Storm went northeast.

1881, September 29, afternoon; Owatonna. Storm went northeast; one hundred buildings more or less damaged.

May 4, 1886.

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*Loc. cit., p. 113.